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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO.      |
|---|-------------|----------------------|---------------------|-----------------------|
| 10/598,142  | 08/18/2006  | Masaru Shirai        | P30470              | 1550                  |
| 7055  | 7590        | 02/19/2010           | EXAMINER            |                       |
| GREENBLUM & BERNSTEIN, P.L.C.<br>1950 ROLAND CLARKE PLACE<br>RESTON, VA 20191 |             |                      |                     | D'ANIELLO, NICHOLAS P |
| ART UNIT  |             | PAPER NUMBER         |                     |                       |
|   |             |                      |                     | 1793                  |
| NOTIFICATION DATE   |             |                      | DELIVERY MODE       |                       |
| 02/19/2010  |             |                      | ELECTRONIC          |                       |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com  
pto@gbpatent.com

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/598,142             | SHIRAI ET AL.       |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Nicholas P. D'Aniello  | 1793                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 05 February 2010.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-21 and 23-35 is/are pending in the application.  
 4a) Of the above claim(s) 1-20 and 28-35 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 21 and 23-27 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | Paper No(s)/Mail Date. _____ .                                    |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application |
|  | 6) <input type="checkbox"/> Other: _____ .                        |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1-13-2010 has been entered.

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 21 and 22-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 21 recites "the cool air or hot air" in line 10. There is insufficient antecedent basis for this limitation in the claim. For the purposes of examination this is assumed to be "a cool air or hot air".

Claim 27 recites the limitation "the substrate side" in line 3. There is insufficient antecedent basis for this limitation in the claim. This is assumed to mean the first side of the substrate to be consistent with the amendment.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Please note the following relevant sections of the MPEP:

a. MPEP 2115: "Expressions relating the apparatus to contents thereof during an intended operation **are of no significance in determining patentability of the apparatus claim.**" *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, "[i]nclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims." *In re Young*, 75 F.2d \*>996<, 25 USPQ 69 (CCPA 1935) (as restated in *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963)).

b. MPEP 2114 relating to Apparatus and Article claims – Functional Language: While features of an apparatus may be recited either structurally or functionally, **claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function.** >*In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997).

3. Claims 21 and 23-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Okuno et al. (USP 5,338,008).

In regard to **independent claim 21**, Okuno et al. teach a solder bump forming apparatus, see figure 1 (*for forming a solder bump through heating and reflowing a solder composition on a substrate where a plurality of pad electrodes are provided*, is intended use MPEP 2111.02 and does not limit the structure of the apparatus however Okuno et al. forms solder bumps on a printed board PB with pad electrodes by reflowing), wherein: (*the solder composition is made of a mixture of solder particles and a liquid material that contains a flux component, which becomes liquid at a normal temperature or when heated*, relates to the material worked upon by the apparatus MPEP 2115 and does not limit the structure of the apparatus, however Okuno et al. uses a solder paste i.e. solder particles and flux see column 1 lines 26-45); and a heating device (upper or lower heater 3) is provided for heating the solder composite from a first side; and a thermostat device (many elements, such as heating element 7, cooling device 10, rectifying plate 11, fan 16, jacket 17) for controlling a temperature of the solder composition is provided at a position above a mount plate (conveyor 2) (column 3 line 66 - column 4 line 50).

In regard to the amendment, Okuno et al. is taken to embrace "wherein the thermostat device includes a system in which the cool air or hot air of the thermostat device does not directly come in contact with the solder composition on the substrate" because (A) Okuno et al. teaches a system (upper portion of figure 2 above jacket 17) which circulates outside air with fan 20 and constitutes a heat exchange means (and therefore the air is taken to be either hot or cool) for the thermostat device (cooling device 10) but does not allow the outside air to come into contact with the solder

composition because jacket 17 completely separates the outside air from the solder composition (see figure 2 - column 4 lines 55-64) and (B) the limitation relates to a functional limitation and as the apparatus of Okuno et al. has all the claimed structure it is reasonably taken to be capable of performing the claimed function.

In regard to **claim 23**, the thermostat device comprises a radiation plate (jacket 17, gas blowing port 12 in plate) for heating the solder composition by radiant heat and a heating section (preheating section S or heating section H) for heating the radiation plate (figure 2).

In regard to **claim 24** the thermostat device comprises a heat absorbing plate (rectifying plate 11) for depriving heat of the solder composition and an endothermic section (cooling section C) for cooling the heat absorbing plate (figures).

In regard to **claim 25**, the heating device 3 applies heat by blowing hot air (with fan 16) to a bottom side of the substrate (figures).

In regard to **claim 26**, the heating device 3 heats a bottom side of the substrate by thermal conduction (forced air is thermal conduction).

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okuno as applied to claim 21 above, and further in view of Campbell (USP 4,334,646).

Okuno teaches the solder bump forming apparatus as applied above where the heating device 3 heats the solder composition from the substrate side. **Claim 27** differs from the reference in calling for the substrate to be immersed in the solder composition within a container which is heated. However, Campbell et al. teach a similar solder bump forming apparatus (figure 1) and the desirability to heat the substrate 44, 50 as it is immersed in the solder composition within a container 30; and the heating device heats the solder composition from the substrate side through the container to prevent oxidation from occurring and increase the continuity of the connections (column 3 lines 46-60).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the substrate in a container immersed in the solder composition in the apparatus of Okuno as such prevents oxidation creating better connections as taught by Campbell.

### ***Response to Arguments***

Applicant's arguments have been fully considered but they are not persuasive. Specifically, apparatus claims must distinguish from the prior art in terms of structure. The new limitation relates to a function of the apparatus and does not define the structure. In any event, the apparatus of Okuno et al. teaches the thermostat device includes a system (jacket 17 and fan 10) which circulates outside air (that acts as a heat

Art Unit: 1793

exchange means and therefore must be either hot or cool air) that does not come into contact with the solder composition as applied above.

***Inquiries***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas P. D'Aniello whose telephone number is (571)270-3635. The examiner can normally be reached on Monday through Thursday from 8am to 5pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. P. D./  
Examiner, Art Unit 1793

/Jessica L. Ward/  
Supervisory Patent Examiner, Art Unit 1793